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An integrated approach to monitor and control the invasive fungal pathogen *Heterobasidion irregulare* in European forest stands

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The North American fungal pathogen *Heterobasidion irregulare* is currently distributed in pine and oak stands along 103 km of coastline of central Italy. This paper reviews the pathways of introduction and invasion, the factors driving the invasion, and the dispersal abilities of this pathogen in Italy. Furthermore, an integrated disease management program to minimize the risk of spread of the fungus in Europe is suggested, based both on published literature and on new unpublished data. Observational and genetic evidence support a single introduction through infected wood during WWII, and a subsequent invasion through spore dispersal. Experimental evidence suggests transmission potential of the pathogen rather than hyper-susceptibility of native hosts is the major determinant of invasion. The current range of *H. irregulare* is too vast to suggest eradication, however we recommend minimizing the risk of spread of *H. irregulare* outside the zone of infestation while reducing the magnitude of infestations within its current range. We provide evidence suggesting the most cost-effective management approach hinges on preventing the saprobic establishment of the fungus in stumps in a “buffer” area surrounding the current zone of infestation.